

## WHAT WE CLAIMES IS:

1. An image output control system comprising an image processing device that makes image data subjected to a preset series of image processing and an image output device that creates dots according to a result of the preset series of image processing to output an image,

said image processing device comprising:

a dot number specification module that collects a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group and specifies number of dots to be created in each pixel group according to the image data; and

a number data supply module that supplies dot number data representing the number of dots specified with regard to each pixel group to said image output device,

said image output device comprising:

a number data receiving module that receives the dot number data with regard to each pixel group;

a priority order selection module that selects a priority order of pixels for dot formation in each pixel group;

a pixel position determination module that determines position of each dot-on pixel included in each pixel group, based on the received dot number data and the selected priority order; and

a dot formation module that actually creates a dot at the determined position of each dot-on pixel.

2. An image output control system in accordance with claim 1, wherein said priority order selection module selects one priority order for each pixel group, among multiple priority orders prepared in advance.

3. An image output control system in accordance with claim 1, wherein said number data supply module encodes the dot number data and supplies the encoded dot number data,

5       said number data receiving module receives the encoded dot number data and decodes the encoded dot number data to the number of dots to be created in each pixel group, and

      said pixel position determination module determines the position of each dot on pixel included in each pixel group, based on the  
10    decoded dot number data and the selected priority order.

4. An image output control system in accordance with claim 1, wherein said dot number specification module refers to a dither matrix, which maps threshold values to respective pixels arranged in a  
15   two-dimensional array, and specifies the number of dots to be created in each pixel group, and

      said priority order selection module divides the dither matrix referred to for the dot number specification into multiple groups corresponding to multiple pixel groups, specifies a priority order of  
20   pixels in each pixel group based on a result of comparison between the image data of respective pixels included in the pixel group and corresponding threshold values, and stores the specified priority orders of the multiple pixel groups as the multiple priority orders,

      said priority order selection module selecting one priority order  
25   corresponding to a position of each pixel group in the image, among the multiple priority orders based on the dither matrix.

5. An image output device that receives processed image data, which has gone through a preset series of image processing, and  
30   creates dots according to the received image data to output an image,

said image output device comprising:

5 a number data receiving module that receives dot number data representing number of dots to be created in each pixel group, as the image data, where the pixel group includes a predetermined number of plural pixels collected among a large number of pixels constituting the image;

a priority order selection module that selects a priority order of pixels for dot formation in each pixel group;

10 a pixel position determination module that determines position of each dot-on pixel included in each pixel group, based on the received dot number data and the selected priority order; and

a dot formation module that actually creates a dot at the determined position of each dot-on pixel.

15 6. An image output device in accordance with claim 5, wherein said priority order selection module selects one priority order for each pixel group, among multiple priority orders prepared in advance.

20 7. An image output device in accordance with claim 5, wherein said number data receiving module receives encoded dot number data and decodes the encoded dot number data to the number of dots to be created in each pixel group, and

25 said pixel position determination module determines the position of each dot-on pixel included in each pixel group, based on the decoded dot number data and the selected priority order.

30 8. An image output device in accordance with claim 5, wherein said number data receiving module receives the dot number data in each pixel group of plural pixels that are adjacent to one another and have a preset positional relation.

9. An image output device in accordance with claim 7, wherein said priority order selection module stores the multiple priority orders in the form of a priority order matrix that arranges the multiple  
5 priority orders in a preset two-dimensional array,

said priority order selection module selecting one priority order corresponding to a position of each pixel group in the image, among the multiple priority orders stored in the priority order matrix.

10 10. An image output device in accordance with claim 9, wherein said priority order selection module divides a dither matrix, which maps threshold values to respective pixels arranged in a two-dimensional array, into multiple groups corresponding to multiple pixel groups, specifies a priority order of pixels in each pixel group  
15 based on a result of comparison between the image data of respective pixels included in the pixel group and corresponding threshold values, and stores the specified priority orders of the multiple pixel groups in the form of the priority order matrix.

20 11. An image output device in accordance with claim 5, wherein said pixel position determination module comprises:

a priority number specification module that specifies a priority number of each pixel for dot formation in each pixel group according to the selected priority order; and

25 a pixel position detection module that detects the position of each dot on pixel included in each pixel group, based on the dot number data of the pixel group and the priority numbers of respective pixels in the pixel group.

30 12. An image output device in accordance with claim 5, wherein

said pixel position determination module comprises:

an intermediate data generation module that generates intermediate data from the dot number data of one pixel group, where the pixel group consists of N pixels, the number of dots to be created in the pixel group is equal to M, and the intermediate data of the pixel group includes M consecutive data elements representing dot formation and (N-M) consecutive data elements representing no dot formation; and

a pixel position detection module that specifies a priority number of each pixel for dot formation in the pixel group according to the selected priority order and reads a relevant data element of the intermediate data corresponding to the priority number of each pixel in the pixel group, so as to detect the position of each dot-on pixel in the pixel group.

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13. An image output device in accordance with claim 12, wherein said pixel position detection module shifts the intermediate data by a number of data elements corresponding to the priority number of each pixel in a direction of the data elements representing dot formation and reads a data element at an end of the shifted intermediate data, so as to detect the position of each dot-on pixel.

14. An image processing device that causes input image data representing an image to go through a preset series of image processing and thereby generates control data, which is used for control of dot formation by an image output device that creates dots and outputs a resulting processed image, said image processing device comprising:

a pixel group setting module that collects a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

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a dot number specification module that causes at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifies number of dots to be created in each pixel group according to the image data of the pixel group; and

a number data supply module that supplies dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device.

10           15. An image processing device in accordance with claim 14, wherein said dot number specification module comprises:

a relation storage module that stores multiple relations between the image data of each pixel group and the number of dots to be created in the pixel group; and

15           a specification module that refers to one of the multiple relations and specifies the number of dots to be created in each pixel group according to the image data of respective pixels included in the pixel group.

20           16. An image processing device in accordance with either one of claims 14 and 15, wherein said number data supply module encodes the dot number data and supplies the encoded dot number data as the control data.

25           17. An image processing device in accordance with claim 14, wherein said pixel group setting module divides the image into multiple pixel groups by collecting the predetermined number of plural pixels to each pixel group, and

30           said dot number specification module specifies the number of dots to be created in each pixel group according to the image data of

respective pixels included in the pixel group.

18. An image processing device in accordance with claim 14,  
wherein said dot number specification module specifies the number of  
5 dots to be created in each pixel group, such that tone errors relative to  
the image data caused by the dot number specification are cancelled  
each other between at least plural pixel groups within a preset range.

19. An image processing device that causes input image data  
10 representing an image to go through a preset series of image processing  
and thereby generates control data, which is used for control of dot  
formation by an image output device that creates dots and outputs a  
resulting processed image, said image processing device comprising:

a dither matrix storage module that stores a dither matrix,  
15 which maps threshold values to respective pixels arranged in a  
two-dimensional array;

a pixel group setting module that collects a predetermined  
number of plural pixels, among a large number of pixels constituting  
the image, to each pixel group;

20 a dot number specification module that compares the image data  
of respective pixels included in each pixel group with threshold values  
set at corresponding positions in the dither matrix, so as to specify  
number of dots to be created in the pixel group; and

a number data supply module that supplies dot number data  
25 representing the number of dots specified with regard to each pixel  
group as the control data to said image output device.

20. An image output control method that makes image data  
subjected to a preset series of image processing and creates dots  
30 according to a result of the preset series of image processing to output

an image,

said image output control method comprising:

a first step of collecting a predetermined number of plural pixels,  
among a large number of pixels constituting the image, to each pixel  
5 group and specifying number of dots to be created in each pixel group  
according to the image data;

a second step of selecting a priority order of pixels for dot  
formation in each pixel group;

a third step of determining position of each dot on pixel included  
10 in each pixel group, based on the specified number of dots and the  
selected priority order of the pixel group; and

a fourth step of actually creating a dot at the determined  
position of each dot on pixel.

15 21. An image output control method in accordance with claim 20,  
wherein said first step refers to a dither matrix, which maps threshold  
values to respective pixels arranged in a two-dimensional array, and  
specifies the number of dots to be created in each pixel group, and

said second step divides the dither matrix referred to for the dot  
20 number specification into multiple groups corresponding to multiple  
pixel groups, specifies a priority order of pixels in each pixel group  
based on a result of comparison between the image data of respective  
pixels included in the pixel group and corresponding threshold values,  
and stores the specified priority orders of the multiple pixel groups,

25 said second step selecting one priority order corresponding to a  
position of each pixel group in the image, among multiple priority  
orders stored with regard to the multiple groups of the dither matrix.

22. An image output method that receives processed image data,  
30 which has gone through a preset series of image processing, and



creates dots according to the received image data to output an image, said image output method comprising the steps of:

(A) receiving dot number data representing number of dots to be created in each pixel group, as the image data, where the pixel group includes a predetermined number of plural pixels collected among a large number of pixels constituting the image;

(B) selecting a priority order of pixels for dot formation in each pixel group;

(C) determining position of each dot on pixel included in each pixel group, based on the received dot number data and the selected priority order; and

(D) actually creating a dot at the determined position of each dot on pixel.

23. An image processing method that causes input image data representing an image to go through a preset series of image processing and thereby generates control data, which is used for control of dot formation by an image output device that creates dots and outputs a resulting processed image, said image processing method comprising the steps of:

(a) collecting a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

(b) causing at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifying number of dots to be created in each pixel group according to the image data of the pixel group; and

(c) supplying dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device.

24. An image output control program that is executed by a computer to make image data subjected to a preset series of image processing, create dots according to a result of the preset series of image processing, and thereby output an image,

said image output control program causing the computer to attain:

a first function of collecting a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group and specifying number of dots to be created in each pixel group according to the image data;

a second function of selecting a priority order of pixels for dot formation in each pixel group;

a third function of determining position of each dot-on pixel included in each pixel group, based on the specified number of dots and the selected priority order of the pixel group; and

a fourth function of actually creating a dot at the determined position of each dot-on pixel.

25. An image output control program in accordance with claim 24, wherein said first function refers to a dither matrix, which maps threshold values to respective pixels arranged in a two-dimensional array, and specifies the number of dots to be created in each pixel group, and

said second function divides the dither matrix referred to for the dot number specification into multiple groups corresponding to multiple pixel groups, specifies a priority order of pixels in each pixel group based on a result of comparison between the image data of respective pixels included in the pixel group and corresponding threshold values, and stores the specified priority orders of the

multiple pixel groups,

said second function selecting one priority order corresponding to a position of each pixel group in the image, among multiple priority orders stored with regard to the multiple groups of the dither matrix.

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26. An image output program that is executed by a computer to receive processed image data, which has gone through a preset series of image processing, create dots according to the received image data, and thereby output an image, said image output program causing the  
10 computer to attain the functions of:

(A) receiving dot number data representing number of dots to be created in each pixel group, as the image data, where the pixel group includes a predetermined number of plural pixels collected among a large number of pixels constituting the image;

15 (B) selecting a priority order of pixels for dot formation in each pixel group;

(C) determining position of each dot on pixel included in each pixel group, based on the received dot number data and the selected priority order; and

20 (D) actually creating a dot at the determined position of each dot on pixel.

27. An image processing program that is executed by a computer to make input image data representing an image subjected to a preset  
25 series of image processing and thereby generate control data, which is used for control of dot formation by an image output device that creates dots and outputs a resulting processed image, said image processing program causing the computer to attain the functions of:

(a) collecting a predetermined number of plural pixels, among a  
30 large number of pixels constituting the image, to each pixel group;

(b) causing at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifying number of dots to be created in each pixel group according to the image data of the pixel group; and

(c) supplying dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device.

28. An image output control system comprising an image processing device that makes image data subjected to a preset series of image processing and an image output device that creates dots according to a result of the preset series of image processing to output an image,

said image processing device comprising:

a pixel group setting module that collects a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

a dot number specification module that causes at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifies number of dots to be created in each pixel group according to the image data of the pixel group; and

a number data supply module that supplies dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device,

said image output device comprising:

a number data receiving module that receives the dot number data with regard to each pixel group;

a pixel position determination module that determines

position of each dot-on pixel in each pixel group, based on the received dot number data; and

a dot formation module that actually creates a dot at the determined position of each dot-on pixel.

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29. An image output control method that makes image data subjected to a preset series of image processing and creates dots according to a result of the preset series of image processing to output an image,

10       said image output control method comprising:

a first step of collecting a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

15       a second step of causing at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifying number of dots to be created in each pixel group according to the image data of the pixel group;

20       a third step of determining position of each dot-on pixel in each pixel group, based on the specified number of dots; and

a fourth step of actually creating a dot at the determined position of each dot-on pixel.

25       30. An image output control system comprising an image processing device that makes image data subjected to a preset series of image processing and an image output device that creates dots according to a result of the preset series of image processing to output an image,

      said image processing device comprising:

30       a number specification unit that collects a predetermined

number of plural pixels, among a large number of pixels constituting the image, to each pixel group and specifies number of dots to be created in each pixel group according to the image data; and

5 a data transmitter that supplies dot number data representing the number of dots specified with regard to each pixel group to said image output device,

said image output device comprising:

a data receiver that receives the dot number data with regard to each pixel group;

10 a selector that selects a priority order of pixels for dot formation in each pixel group;

an operator that determines position of each dot on pixel included in each pixel group, based on the received dot number data and the selected priority order; and

15 a dot formation unit that actually creates a dot at the determined position of each dot on pixel.

31. An image output device that receives processed image data, which has gone through a preset series of image processing, and  
20 creates dots according to the received image data to output an image, said image output device comprising:

a data receiver that receives dot number data representing number of dots to be created in each pixel group, as the image data, where the pixel group includes a predetermined number of plural  
25 pixels collected among a large number of pixels constituting the image;

a selector that selects a priority order of pixels for dot formation in each pixel group;

an operator that determines position of each dot on pixel included in each pixel group, based on the received dot number data  
30 and the selected priority order; and

a dot formation unit that actually creates a dot at the determined position of each dot on pixel.

32. An image processing device that causes input image data representing an image to go through a preset series of image processing and thereby generates control data, which is used for control of dot formation by an image output device that creates dots and outputs a resulting processed image, said image processing device comprising:

a generator that collects a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

a number specification unit that causes at least a plurality of the pixel groups to have different relations between the image data of each pixel group and number of dots to be created in the pixel group, and specifies number of dots to be created in each pixel group according to the image data of the pixel group; and

a data transmitter that supplies dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device.

33. An image processing device that causes input image data representing an image to go through a preset series of image processing and thereby generates control data, which is used for control of dot formation by an image output device that creates dots and outputs a resulting processed image, said image processing device comprising:

a memory that stores a dither matrix, which maps threshold values to respective pixels arranged in a two-dimensional array;

a generator that collects a predetermined number of plural pixels, among a large number of pixels constituting the image, to each pixel group;

a comparator that compares the image data of respective pixels included in each pixel group with threshold values set at corresponding positions in the dither matrix stored in said memory;

a number specification unit that specifies number of dots to be  
5 created in the pixel group, based on a result of the comparison; and

a data transmitter that supplies dot number data representing the number of dots specified with regard to each pixel group as the control data to said image output device.